



UNIÓN INTERNACIONAL DE TELECOMUNICACIONES

UIT-T

SECTOR DE NORMALIZACIÓN
DE LAS TELECOMUNICACIONES
DE LA UIT

G.854.3

(03/99)

SERIE G: SISTEMAS Y MEDIOS DE TRANSMISIÓN,
SISTEMAS Y REDES DIGITALES

Sistemas de transmisión digital – Redes digitales –
Gestión de red de transporte

**Punto de vista computacional para la gestión de
topologías**

Recomendación UIT-T G.854.3

(Anteriormente Recomendación del CCITT)

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RECOMENDACIÓN UIT-T G.854.3

PUNTO DE VISTA COMPUTACIONAL PARA LA GESTIÓN DE TOPOLOGÍAS

Resumen

La comunidad de gestión de topología se utiliza para gestionar la topología de un dominio de red de capa y las relaciones entre los recursos del dominio de red de capa que se está gestionando. El servicio proporcionado por la comunidad permite la creación y supresión de los siguientes recursos dentro del dominio de red de capa: subred, enlace, enlace topológico, extremo de enlace, extremo de enlace topológico y grupo de acceso. El servicio proporciona también un conjunto de acciones de informe para poner en conocimiento de los posibles receptores de notificaciones la creación y la supresión de recursos en la comunidad. El servicio está disponible entre un solo llamante y un solo proveedor.

La partición de subredes y enlaces no están comprendidas en esta comunidad.

Esta especificación abarca las siguientes acciones de la comunidad de empresa:

- crear grupo de acceso;
- suprimir grupo de acceso;
- crear enlace;
- suprimir enlace;
- crear extremo de enlace;
- suprimir extremo de enlace;
- crear subred;
- suprimir subred;
- crear enlace topológico;
- suprimir enlace topológico;
- crear extremo de enlace topológico;
- suprimir extremo de enlace topológico;
- informar creación de grupo de acceso;
- informar supresión de grupo de acceso;
- informar creación de enlace;
- informar supresión de enlace;
- informar creación de extremo de enlace;
- informar supresión de extremo de enlace;
- informar creación de subred;
- informar supresión de subred;
- informar creación de enlace topológico;
- informar supresión de enlace topológico;
- informar creación de extremo de enlace topológico;
- informar supresión de extremo de enlace topológico.

Orígenes

La Recomendación UIT-T G.854.3 ha sido preparada por la Comisión de Estudio 4 (1997-2000) del UIT-T y fue aprobada por el procedimiento de la Resolución N.º 1 de la CMNT el 26 de marzo de 1999.

PREFACIO

La UIT (Unión Internacional de Telecomunicaciones) es el organismo especializado de las Naciones Unidas en el campo de las telecomunicaciones. El UIT-T (Sector de Normalización de las Telecomunicaciones de la UIT) es un órgano permanente de la UIT. Este órgano estudia los aspectos técnicos, de explotación y tarifarios y publica Recomendaciones sobre los mismos, con miras a la normalización de las telecomunicaciones en el plano mundial.

La Conferencia Mundial de Normalización de las Telecomunicaciones (CMNT), que se celebra cada cuatro años, establece los temas que han de estudiar las Comisiones de Estudio del UIT-T, que a su vez producen Recomendaciones sobre dichos temas.

La aprobación de Recomendaciones por los Miembros del UIT-T es el objeto del procedimiento establecido en la Resolución N.º 1 de la CMNT.

En ciertos sectores de la tecnología de la información que corresponden a la esfera de competencia del UIT-T, se preparan las normas necesarias en colaboración con la ISO y la CEI.

NOTA

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Recomendación G.854.3

PUNTO DE VISTA COMPUTACIONAL PARA LA GESTIÓN DE TOPOLOGÍAS

(Ginebra, 1999)

1 Alcance

Esta especificación del punto de vista computacional está relacionada con la especificación de empresa de gestión de topología definida en la Recomendación G.852.3 y la especificación de información de gestión de topología definida en la Recomendación G.853.3.

2 Referencias

Las siguientes Recomendaciones del UIT-T y otras referencias contienen disposiciones que, mediante su referencia en este texto, constituyen disposiciones de la presente Recomendación. Al efectuar esta publicación, estaban en vigor las ediciones indicadas. Todas las Recomendaciones y otras referencias son objeto de revisiones por lo que se preconiza que los usuarios de esta Recomendación investiguen la posibilidad de aplicar las ediciones más recientes de las Recomendaciones y otras referencias citadas a continuación. Se publica periódicamente una lista de las Recomendaciones UIT-T actualmente vigentes.

- [1] Recomendación UIT-T G.851.1 (1996), *Gestión de la red de transporte – Aplicación del marco del modelo de referencia de procesamiento distribuido abierto*.
- [2] Recomendación UIT-T G.853.1 (1999), *Elementos comunes del punto de vista de la información para la gestión de una red de transporte*.
- [3] Recomendación UIT-T G.852.3 (1999), *Punto de vista de la empresa para la gestión de topologías*.
- [4] Recomendación UIT-T G.853.3 (1999), *Punto de vista de la información para la gestión de topologías*.

3 Definiciones

Ninguna.

4 Abreviaturas

En esta Recomendación se utilizan las siguientes siglas.

AG	Grupo de acceso (<i>access group</i>)
ASN.1	Notación de sintaxis abstracta uno (<i>abstract syntax notation one</i>)
CTP	Punto de terminación de la conexión (<i>connection termination point</i>)
Id	Identificador
Ifce	Interfaz (<i>interface</i>)
inv	invariante
layerND	Dominio capa de red (<i>layer network domain</i>)

LE	Extremo de enlace (<i>link end</i>)
LND	Dominio capa de red (<i>layer network domain</i>)
NTTP	Punto de terminación de camino de red (<i>network trail termination point</i>)
RM-ODP	Modelo de referencia de procesamiento distribuido abierto (<i>reference model for open distributed processing</i>)
SN	Subred (<i>subnetwork</i>)
SNC	Conexión de subred (<i>subnetwork connection</i>)
SNTP	Punto de terminación de subred (<i>subnetwork termination point</i>)
TL	Enlace topológico (<i>topological link</i>)
TLE	Extremo de enlace topológico (<i>topological link end</i>)
topman	gestión de topologías (<i>topology management</i>)
TP	Punto de terminación (<i>termination point</i>)
TTP	Punto de terminación de camino (<i>trail termination point</i>)
UIT	Unión Internacional de Telecomunicaciones

5 Convenios

Para facilitar la comprensión del comportamiento de las operaciones:

- los parámetros se escriben en **negrita**;
- los elementos definidos en la especificación de información se escriben en *cursiva*.

6 Referencias de etiquetas

Referencia de etiqueta completa	Referencia de etiqueta local
<"Rec. G.853.1", INFORMATION_OBJECT:linkConnection>	linkConnection
<"Rec. G.853.1", INFORMATION_OBJECT:networkCTP>	networkCTP
<"Rec. G.853.1", INFORMATION_OBJECT:subnetworkConnection>	subnetworkConnection
<"Rec. G.853.3", INFORMATION_OBJECT: topmanAccessGroup>	topmanAccessGroup
<"Rec. G.853.3", INFORMATION_OBJECT: topmanLayerNetworkDomain>	topmanLayerNetworkDomain
<"Rec. G.853.3", INFORMATION_OBJECT: topmanLink>	topmanLink
<"Rec. G.853.3", INFORMATION_OBJECT: topmanLinkEnd>	topmanLinkEnd
<"Rec. G.853.3", INFORMATION_OBJECT: topmanNetworkTTP>	topmanNetworkTTP
<"Rec. G.853.3", INFORMATION_OBJECT: topmanSubnetwork>	topmanSubnetwork
<"Rec. G.853.3", INFORMATION_OBJECT: topmanSubnetworkTP>	topmanSubnetworkTP
<"Rec. G.853.3", INFORMATION_OBJECT: topmanTopologicalLink>	topmanTopologicalLink
<"Rec. G.853.3", INFORMATION_OBJECT: topmanTopologicalLinkEnd>	topmanTopologicalLinkEnd
<"Rec. G.853.1", ATTRIBUTE: linkDirectionality>	linkDirectionality
<"Rec. G.853.1", ATTRIBUTE: pointDirectionality>	pointDirectionality
<"Rec. G.853.1", ATTRIBUTE: resourceId>	resourceId

Referencia de etiqueta completa	Referencia de etiqueta local
<"Rec. G.853.1", ATTRIBUTE: signalIdentification>	signalIdentification
<"Rec. G.853.1", ATTRIBUTE: topologicalEndDirection>	topologicalEndDirection
<"Rec. G.853.1", ATTRIBUTE: userLabel>	userLabel
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: accessGroupIsMadeOfNetworkTTPs>	accessGroupIsMadeOfNetworkTTPs
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: layerNetworkDomainIsMadeOf>	layerNetworkDomainIsMadeOf
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkBinds>	linkBinds
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkConnectionIsTerminatedByTopologicalEntities>	linkConnectionIsTerminatedByTopologicalEntities
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkEndHasNetworkCTPs>	linkEndHasNetworkCTPs
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkEndIsBoundTo>	linkEndIsBoundTo
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: linkHasLinkConnections>	linkHasLinkConnections
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: subnetworkHasSubnetworkConnections>	subnetworkHasSubnetworkConnections
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: subnetworkIsDelimitedBy>	subnetworkIsDelimitedBy
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: subnetworkTPIsRelatedToExtremity>	subnetworkTPIsRelatedToExtremity
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: topologicalLinkEndIsSupportedByNetworkTTP>	topologicalLinkEndIsSupportedByNetworkTTP
<"Rec. G.853.1", INFORMATION_RELATIONSHIP: topologicalLinkIsSupportedByTrail>	topologicalLinkIsSupportedByTrail

Referencia de producción ASN.1 completa	Referencia de etiqueta local
<"Rec. X.721:1992: Attribute-ASN1Module" : SimpleNameType>	SimpleNameType
<"Rec. X.680:1997": GraphicString>	GraphicString

7 Interfaces

Esta especificación no define operaciones que cambian la userLabel de los recursos o informan de este cambio al receptor de la notificación, porque tales operaciones no cambian el estado del sistema. Su firma exacta será desarrollada como parte de la especificación del punto de vista de la ingeniería, con la tecnología pertinente.

7.1 Interfaces de indagación

Esta especificación hace referencia a interfaces que permiten tener acceso a la identificación y propiedades de recursos que forman parte de la comunidad de "gestión de topologías". Puesto que la invocación de operaciones contenidas no modifica ningún estado, no hay interés en desarrollarlas explícitamente. Su firma exacta será desarrollada como parte del punto de vista de la ingeniería, con la tecnología pertinente. Estas interfaces se indican en el siguiente cuadro junto con la información a que dan acceso.

Nombre de interfaz	Objeto de información	Atributos y relaciones
topmanAccessGroupQueryIfce	<topmanAccessGroup>	<resourceId> <signalIdentification> <topologicalEndDirection> <userLabel> <accessGroupIsMadeOfNetworkTTPs, ROLE: elementTTP> <linkBinds, ROLE: transferCapacityLink> <layerNetworkDomainIsMadeOf, ROLE: containerLND>
topmanLayerNetworkDomainQueryIfce	<topmanLayerNetworkDomain>	<resourceId> <signalIdentification> <layerNetworkDomainIsMadeOf, ROLE: element>
topmanLinkEndQueryIfce	<topmanLinkEnd>	<resourceId> <signalIdentification> <topologicalEndDirection> <userLabel> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <linkEndIsBoundTo, ROLE: topologicalEntity> <linkEndHasNetworkCTPs, ROLE: elementCTP>
topmanLinkQueryIfce	<topmanLink>	<resourceId> <signalIdentification> <linkDirectionality> <userLabel> <linkBinds, ROLE: a_endTopological, ROLE: z_endTopological> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <linkHasLinkConnections, ROLE: elementLC>
topmanNetworkTTPQueryIfce	<topmanNetworkTTP>	<resourceId> <signalIdentification> <subnetworkTPIsRelatedToExtremity, ROLE: abstractionSNTP> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <accessGroupIsMadeOfNetworkTTPs, ROLE: containerAG>

Nombre de interfaz	Objeto de información	Atributos y relaciones
topmanSubnetworkQueryIfce	<topmanSubnetwork>	<resourceId> <signalIdentification> <userLabel> <linkBinds, ROLE: transferCapacityLink> <subnetworkIsDelimitedBy, ROLE: elementSNTTP> <linkEndIsBoundTo, ROLE: transferCapacityLE> <subnetworkHasSubnetworkConnections, ROLE: elementSNC> <linkConnectionIsTerminatedByTopologicalEntities, ROLE: transportEntityLC> <layerNetworkDomainIsMadeOf, ROLE: containerLND>
topmanSubnetworkTPQueryIfce	<topmanSubnetworkTP>	<resourceId> <signalIdentification> <pointDirectionality> <subnetworkIsDelimitedBy, ROLE: containerSN> <subnetworkTPIsRelatedToExtremity, ROLE: extremity> <layerNetworkDomainIsMadeOf, ROLE: containerLND>
topmanTopologicalLinkEndQueryIfce	<topmanTopologicalLinkEnd>	<resourceId> <signalIdentification> <topologicalEndDirection> <userLabel> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <linkEndIsBoundTo, ROLE: topologicalEntity> <topologicalLinkEndIsSupportedByNetworkTTP, ROLE: serverTTP>
topmanTopologicalLinkQueryIfce	<topmanTopologicalLink>	<resourceId> <signalIdentification> <linkDirectionality> <userLabel> <linkBinds, ROLE: a_endTopological, ROLE: z_endTopological> <layerNetworkDomainIsMadeOf, ROLE: containerLND> <topologicalLinkIsSupportedByTrail, ROLE: serverTrail>

7.2 Interfaces operacionales

7.2.1 Interfaz común de recursos

La interfaz común de recursos proporciona funcionalidad para cambiar el identificador (de recurso) de los recursos mediante la operación "cambio de identificador de recurso". Satisface los requisitos de empresa indicados en <"Rec. G.852.2", COMMUNITY: Transport Network Enterprise Model, General policy>.

COMPUTATIONAL_INTERFACE commonResourceIfce {

 OPERATION <changeResourceIdentifier>; }

7.2.1.1 Cambiar identificador de recurso (change resource identifier)

<"Rec. G.852.2", COMMUNITY: Transport Network Enterprise Model, General policy>

OPERATION changeResourceId {

 INPUT_PARAMETERS

 layerND: LayerNetworkDomainId ::= TopmanLayerNetworkDomainQueryIfce;
 involvedResource: ResourceChoice
 newResourceIdentifier: UserIdentifier ::= SimpleNameType;

 OUTPUT_PARAMETERS

 agreedResourceIdentifier: UserIdentifier ::= SimpleNameType;

 RAISED_EXCEPTIONS

 invalidResource: NULL;
 newResourceIdentifierNotUnique: newResourceIdentifier;
 failureToChangeId: NULL;

BEHAVIOUR

SEMI_FORMAL

 PARAMETER_MATCHING

 layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
 involvedResource: <INFORMATION OBJECT networkInformationTop>;
 newResourceIdentifier: <INFORMATION ATTRIBUTE: resourceId>;
 agreedResourceIdentifier: <INFORMATION ATTRIBUTE: resourceId>;

 PRE_CONDITIONS

 inv_existingInvolvedResource

 "**involvedResource** shall refer to *element* in the same <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

 inv_uniqueResourceId

 "**newResourceIdentifier** must not be equal to <resourceId> of any *element* in the same <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

 POST_CONDITIONS

 inv_idChanged

 "<resourceId> of the resource referred to by **involvedResource** has to be equal to **newResourceIdentifier** and **agreedResourceIdentifier**.";

 EXCEPTIONS

 IF PRE_CONDITION inv_existingInvolvedResource NOT_VERIFIED RAISE_EXCEPTION
 invalidResource;

```

        IF PRE_CONDITION inv_uniqueResourceId NOT_VERIFIED RAISE_EXCEPTION
            newResourceIdentifierNotUnique;
        IF POST_CONDITION inv_idChanged NOT_VERIFIED RAISE_EXCEPTION failureToChangeId;
    ;}

```

7.2.2 Interfaz de provisión de recursos de topología

La interfaz de provisión de recursos de topología proporciona la funcionalidad para la provisión de los recursos definidos en <"Rec. G.852.2", COMMUNITY: Transport Network Enterprise Model>.

```

COMPUTATIONAL_INTERFACE topologyResourcesProvisioningIfce {
    OPERATION
        <createAccessGroup>;
        <deleteAccessGroup>;
        <createLink>;
        <deleteLink>;
        <createLinkEnd>;
        <deleteLinkEnd>;
        <createSubnetwork>;
        <deleteSubnetwork>;
        <createTopologicalLink>;
        <deleteTopologicalLink>;
        <createTopologicalLinkEnd>;
        <deleteTopologicalLinkEnd>; }

```

7.2.2.1 Crear grupo de acceso (create access group)

<COMMUNITY: Topology Management, ACTION: create access group>

```

OPERATION createAccessGroup {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        suppliedUserIdentifier: UserIdentifier;
            -- zero length string or 0 implies none supplied.
        suppliedUserLabel: GraphicString;
            -- zero length string implies none supplied.
        suppliedDirection: topologicalEndDirection;

```

```

    OUTPUT_PARAMETERS
        accessGroup: AccessGroupId;

```

```

    RAISED_EXCEPTIONS
        userIdentifierNotUnique: suppliedUserIdentifier;
        failureToSetUserIdentifier: NULL;
        failureToSetUserLabel: NULL;
        failureToCreateAccessGroup: NULL;
        failureToSetDirection: NULL;

```

BEHAVIOUR

SEMI_FORMAL

```

    PARAMETER_MATCHING
        layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
        suppliedUserIdentifier: <INFORMATION ATTRIBUTE: resourceId>;
        suppliedUserLabel: <INFORMATION ATTRIBUTE: userLabel>;
        accessGroup: <INFORMATION OBJECT: topmanAccessGroup>;
        suppliedDirection: <INFORMATION ATTRIBUTE: topologicalEndDirection>;

```

PRE_CONDITIONS

```

inv_uniqueUserIdentifier
    "The suppliedUserIdentifier value shall not be equal to the <resourceId> value of any element in the
    <layerNetworkDomainIsMadeOf> relationship where the layerND refers to containerLND."
```

POST_CONDITIONS

inv_agreedUserIdentifier

"The <resourceId> value of <topmanAccessGroup> referred to by **accessGroup** is equal to the **suppliedUserIdentifier** value, if it is supplied."

inv_agreedUserLabel

"The <userLabel> value of <topmanAccessGroup> referred to by **accessGroup** is equal to the **suppliedUserLabel** value, if it is supplied."

inv_existingAccessGroup

"**accessGroup** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_agreedDirection

"The <topologicalEndDirection> value of <topmanAccessGroup> referred to by **accessGroup** is equal to the **suppliedDirection** value, if it is supplied, or set to 'undefined' if not supplied."

EXCEPTIONS

IF PRE_CONDITION inv_uniqueUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
userIdentifierNotUnique;

IF POST_CONDITION inv_agreedUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
failureToSetUserIdentifier;

IF POST_CONDITION inv_agreedUserLabel NOT_VERIFIED RAISE_EXCEPTION
failureToSetUserLabel;

IF POST_CONDITION inv_existingAccessGroup NOT_VERIFIED RAISE_EXCEPTION
failureToCreateAccessGroup;

IF POST_CONDITION inv_agreedDirection NOT_VERIFIED RAISE_EXCEPTION
failureToSetDirection;

;}

7.2.2.2 Suprimir grupo de acceso (delete access group)

<COMMUNITY: Topology Management, ACTION: delete access group>

OPERATION deleteAccessGroup {

INPUT_PARAMETERS

layerND: LayerNetworkDomainId;
accessGroup: AccessGroupId;

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

incorrectAccessGroup: accessGroup;
networkTTPsExisting: NULL;
failureToDeleteAccessGroup: NULL;

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
accessGroup: <INFORMATION OBJECT: topmanAccessGroup>;

PRE_CONDITIONS

inv_existingAccessGroup

"**accessGroup** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

```

inv_noNetworkTTPs
    "accessGroup shall not refer to any containerAG in a <accessGroupIsMadeOfNetworkTTPs> relationship."

POST_CONDITIONS
inv_noAccessGroup
    "accessGroup does not refer to any element in the <layerNetworkDomainIsMadeOf> relationship."

EXCEPTIONS
IF PRE_CONDITION inv_existingAccessGroup NOT_VERIFIED RAISE_EXCEPTION
    incorrectAccessGroup;
IF PRE_CONDITION inv_noNetworkTTPs NOT_VERIFIED RAISE_EXCEPTION networkTTPsExisting;
IF POST_CONDITION inv_noAccessGroup NOT_VERIFIED RAISE_EXCEPTION
    failureToDeleteAccessGroup;

;}
```

7.2.2.3 Crear enlace (create link)

<COMMUNITY: Topology Management, ACTION: create link>

```

OPERATION createLink {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        a_End: LinkEndChoice;
        z_End: LinkEndChoice;
        suppliedUserIdentifier: UserIdentifier;
            -- zero length string or 0 implies none supplied.
        suppliedUserLabel: GraphicString;
            -- zero length string implies none supplied.
        suppliedDirectionality: linkDirectionality;

    OUTPUT_PARAMETERS
        link: LinkId;

    RAISED_EXCEPTIONS
        incorrectLinkEnds: LinkEndChoice;
        userIdentifierNotUnique: suppliedUserIdentifier;
        failureToSetUserIdentifier: NULL;
        failureToCreateLink: NULL;
        failureToBindLink: NULL;
        failureToSetUserLabel: NULL;
        failureToSetDirectionality: NULL;

    BEHAVIOUR
        SEMI_FORMAL
        PARAMETER_MATCHING
            layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
            subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;
            accessGroup: <INFORMATION OBJECT: topmanAccessGroup>;
            suppliedUserIdentifier: <INFORMATION ATTRIBUTE: resourceId>;
            suppliedUserLabel: <INFORMATION ATTRIBUTE: userLabel>;
            suppliedDirectionality: <INFORMATION ATTRIBUTE: linkDirectionality>;
            link: <INFORMATION OBJECT: topmanLink>;

        PRE_CONDITIONS
inv_sameLayerND
    "a_End and z_End shall both refer to element in the same <layerNetworkDomainIsMadeOf> relationship
    where layerND refers to containerLND."

inv_uniqueUserIdentifier
    "The suppliedUserIdentifier value shall not be equal to the <resourceId> value of any element in the
    <layerNetworkDomainIsMadeOf> relationship where layerND refers to containerLND."
```

POST_CONDITIONS

inv_existingLink

"**link**, **a_End** and **z_End** refer to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_linkBinds

"**a_End** and **z_End** respectively refer to *a_endTopological* and *z_endTopological* in the <linkBinds> relationship where **link** refers to *transferCapacityLink*."

inv_agreedUserIdentifier

"The <resourceId> value of <topmanLink> referred to by **link** is equal to the **suppliedUserIdentifier** value, if it is supplied."

inv_agreedUserLabel

"The <userLabel> value of <topmanLink> referred to by **link** is equal to the **suppliedUserLabel** value, if it is supplied."

"inv_agreedDirectionality

"The <linkDirectionality> value of <topmanLink> referred to by **link** is equal to the **suppliedDirectionality** value, if it is supplied, or set to 'undefined' if not supplied."

EXCEPTIONS

IF PRE_CONDITION inv_sameLayerND NOT_VERIFIED RAISE_EXCEPTION incorrectLinkEnds;

IF PRE_CONDITION inv_uniqueUserIdentifier NOT_VERIFIED RAISE_EXCEPTION

 userIdentifierNotUnique;

IF POST_CONDITION inv_existingLink NOT_VERIFIED RAISE_EXCEPTION failureToCreateLink;

IF POST_CONDITION inv_linkBinds NOT_VERIFIED RAISE_EXCEPTION failureToBindLink;

IF POST_CONDITION inv_agreedUserIdentifier NOT_VERIFIED RAISE_EXCEPTION

 failureToSetUserIdentifier;

IF POST_CONDITION inv_agreedUserLabel NOT_VERIFIED RAISE_EXCEPTION failureToSetUserLabel;

IF POST_CONDITION inv_agreedDirectionality NOT_VERIFIED RAISE_EXCEPTION

 failureToSetDirectionality;

;}

7.2.2.4 Suprimir enlace (delete link)

<COMMUNITY: Topology Management, ACTION: delete link>

OPERATION deleteLink {

 INPUT_PARAMETERS

 layerND: LayerNetworkDomainId;

 link: LinkId;

 OUTPUT_PARAMETERS

 -- none

 RAISED_EXCEPTIONS

 incorrectLink: link;

 linkConnectionExisting: NULL;

 failureToDeleteLink: NULL;

BEHAVIOUR

 SEMI_FORMAL

 PARAMETER_MATCHING

 layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;

 link: <INFORMATION OBJECT: topmanLink>;


```

    PRE_CONDITIONS;
    inv_existingLink
        "link refers to the element in the <layerNetworkDomainIsMadeOf> relationship where layerND refers to
        containerLND."

    inv_noLinkConnection
        "link shall not refer to any containerLink of a <linkHasLinkConnections> relationship."

    POST_CONDITIONS
    inv_noLink
        "link does not participate in any <layerNetworkDomainIsMadeOf> AND <linkBinds> relationships."

    EXCEPTIONS
    IF PRE_CONDITION inv_existingLink NOT_VERIFIED RAISE_EXCEPTION incorrectLink;
    IF PRE_CONDITION inv_noLinkConnection NOT_VERIFIED RAISE_EXCEPTION
        linkConnectionExisting;
    IF POST_CONDITION inv_noLink NOT_VERIFIED RAISE_EXCEPTION failureToDeleteLink;
;}

```

7.2.2.5 Crear extremo de enlace (create link end)

Esta operación crea un extremo de enlace vinculado a una subred.

<COMMUNITY: Topology Management, ACTION: create link end>

```

OPERATION createLinkEnd {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        subnetwork: SubnetworkId;
        suppliedUserIdentifier: UserIdentifier;
            -- zero length string or 0 implies none supplied.
        suppliedUserLabel: GraphicString;
            -- zero length string implies none supplied.
        suppliedDirection: topologicalEndDirection;

    OUTPUT_PARAMETERS
        linkEnd: LinkEndId;

    RAISED_EXCEPTIONS
        incorrectSubnetwork: subnetwork;
        userIdentifierNotUnique: suppliedUserIdentifier;
        failureToCreateLinkEnd: NULL;
        failureToBindLinkEnd: NULL;
        failureToSetUserIdentifier: NULL;
        failureToSetUserLabel: NULL;
        failureToSetDirection: NULL;
}

```

BEHAVIOUR

SEMI_FORMAL

```

PARAMETER_MATCHING
    layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
    subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;
    suppliedUserIdentifier: <INFORMATION ATTRIBUTE: resourceId>;
    suppliedUserLabel: <INFORMATION ATTRIBUTE: userLabel>;
    suppliedDirection: <INFORMATION ATTRIBUTE: topologicalEndDirection>;
    linkEnd: <INFORMATION OBJECT: topmanLinkEnd>;

```

```

PRE_CONDITIONS
  inv_subnetworkExisting
    "subnetwork shall refer to element in the <layerNetworkDomainIsMadeOf> relationship where layerND
    refers to containerLND."

  inv_uniqueUserIdentifier
    "The suppliedUserIdentifier value shall not be equal to the <resourceId> value of any element in the
    <layerNetworkDomainIsMadeOf> relationship where layerND refers to containerLND.";

POST_CONDITIONS
  inv_existingLinkEnd
    "linkEnd and subnetwork refer to element in the same <layerNetworkDomainIsMadeOf> relationship
    where layerND refers to containerLND."

  inv_boundLinkEnd
    "linkEnd refers to transferCapacityLE in the <linkEndIsBoundTo> relationship where subnetwork refers
    to topologicalEntity."

  inv_agreedUserIdentifier
    "The <resourceId> value of <topmanLinkEnd> referred to by linkEnd is equal to the
    suppliedUserIdentifier value, if it is supplied."

  inv_agreedUserLabel
    "The <userLabel> value of <topmanLinkEnd> referred to by linkEnd is equal to the suppliedUserLabel
    value, if it is supplied."

  inv_agreedDirection
    "The <topologicalEndDirection> value of <topmanLinkEnd> referred to by linkEnd is equal to the
    suppliedDirection value, if it is supplied, or set to 'undefined' if not supplied."

EXCEPTIONS
  IF PRE_CONDITION inv_subnetworkExisting NOT_VERIFIED RAISE_EXCEPTION
    incorrectSubnetwork;
  IF PRE_CONDITION inv_uniqueUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
    userIdentifierNotUnique;
  IF POST_CONDITION inv_existingLinkEnd NOT_VERIFIED RAISE_EXCEPTION
    failureToCreateLinkEnd;
  IF POST_CONDITION inv_boundLinkEnd NOT_VERIFIED RAISE_EXCEPTION failureToBindLinkEnd;
  IF POST_CONDITION inv_agreedUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
    failureToSetUserIdentifier;
  IF POST_CONDITION inv_agreedUserLabel NOT_VERIFIED RAISE_EXCEPTION
    failureToSetUserLabel;
  IF POST_CONDITION inv_agreedDirection NOT_VERIFIED RAISE_EXCEPTION failureToSetDirection;
;}
```

7.2.2.6 Suprimir extremo de enlace (delete link end)

<COMMUNITY: Topology Management, ACTION: delete link end>

```

OPERATION deleteLinkEnd {
  INPUT_PARAMETERS
    layerND: LayerNetworkDomainId;
    linkEnd: LinkEndId;

  OUTPUT_PARAMETERS
    -- none

  RAISED_EXCEPTIONS
    incorrectLinkEnd: linkEnd;
    networkCTPExisting: NULL;
    failureToDeleteLinkEnd: NULL;
```

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;

linkEnd: <INFORMATION OBJECT: topmanLinkEnd>;

PRE_CONDITIONS

inv_existingLinkEnd

"**linkEnd** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_noNetworkCTPs

"**linkEnd** shall not refer to any *containerLE* in a <linkEndHasNetworkCTPs> relationship."

POST_CONDITIONS

inv_noLinkEnd

"**linkEnd** does not refer to any *element* in the <layerNetworkDomainIsMadeOf> relationship."

EXCEPTIONS

IF PRE_CONDITION inv_existingLinkEnd NOT_VERIFIED RAISE_EXCEPTION incorrectLinkEnd;

IF PRE_CONDITION inv_noNetworkCTPs NOT_VERIFIED RAISE_EXCEPTION networkCTPExisting;

IF POST_CONDITION inv_noLinkEnd NOT_VERIFIED RAISE_EXCEPTION failureToDeleteLinkEnd;

;}

7.2.2.7 Crear subred (create subnetwork)

<COMMUNITY: Topology Management, ACTION: create subnetwork>

OPERATION createSubnetwork {

INPUT_PARAMETERS

layerND: LayerNetworkDomainId;

suppliedUserIdentifier: UserIdentifier;

-- zero length string or 0 implies none supplied.

suppliedUserLabel: GraphicString;

-- zero length string implies none supplied.

OUTPUT_PARAMETERS

subnetwork: SubnetworkId;

networkTTPs: SetOfNetworkTTPs;

-- the networkTTPs parameter value is provided when <PERMISSION: successReturnTTPs> is

-- supported.

RAISED_EXCEPTIONS

userIdentifierNotUnique: suppliedUserIdentifier;

failureToSetUserIdentifier: NULL;

failureToSetUserLabel: NULL;

failureToCreateSubnetwork: NULL;

failureToCreateNTTP: NULL;

failureToAssociateNTTP: NULL;

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;

suppliedUserIdentifier: <INFORMATION ATTRIBUTE: resourceId>;

suppliedUserLabel: <INFORMATION ATTRIBUTE: userLabel>;

subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;

networkTTPs ELEMENTS: <INFORMATION OBJECT: topmanNetworkTTP>;

PRE_CONDITIONS

inv_uniqueUserIdentifier

"The **suppliedUserIdentifier** value shall not be equal to the <resourceId> value of any *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

POST_CONDITIONS

inv_agreedUserIdentifier

"The <resourceId> value of the <topmanSubnetwork> referred to by **subnetwork** is equal to the **suppliedUserIdentifier** value, if it is supplied."

inv_agreedUserLabel

"The <userLabel> value of the <topmanSubnetwork> referred to by **subnetwork** is equal to the **suppliedUserIdentifier** value, if it is supplied."

inv_existingSubnetwork

"**subnetwork** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

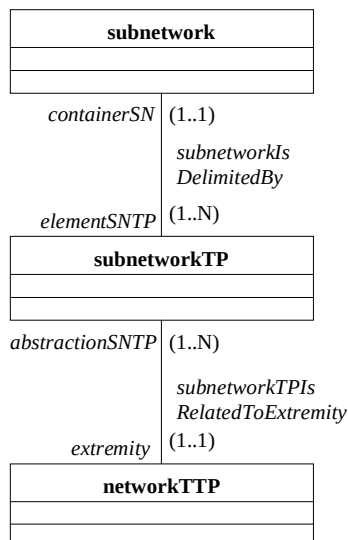
-- NOTE – The following invariants are only needed if the networkTTPs appear automatically when the subnetwork is created.

inv_existingNetworkTTP

"**networkTTPs** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_nttpAssociated

"**networkTTPs** refers to *extremity* of the <subnetworkTPIsRelatedToExtremity> relationship where the *abstractionSNTP* (which is a subnetworkTP) is also *elementSNTP* of a <subnetworkIsDelimitedBy> relationship where **subnetwork** refers to *containerSN*."



";

EXCEPTIONS

IF PRE_CONDITION inv_uniqueUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
userIdentifierNotUnique;

IF POST_CONDITION inv_agreedUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
failureToSetUserIdentifier;

IF POST_CONDITION inv_agreedUserLabel NOT_VERIFIED RAISE_EXCEPTION failureToSetUserLabel;
IF POST_CONDITION inv_existingSubnetwork NOT_VERIFIED RAISE_EXCEPTION
failureToCreateSubnetwork;

IF POST_CONDITION inv_existingNetworkTTP NOT_VERIFIED RAISE_EXCEPTION
failureToCreateNTTP;

```

        IF POST_CONDITION inv_nttpAssociated NOT_VERIFIED RAISE_EXCEPTION failureToAssociateNTTP;
    ;}

```

7.2.2.8 Suprimir subred (delete subnetwork)

<COMMUNITY: Topology Management, ACTION: delete subnetwork>

OPERATION deleteSubnetwork {

INPUT_PARAMETERS

layerND: LayerNetworkDomainId;
subnetwork: SubnetworkId;

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

incorrectSubnetwork: subnetwork;
subnetworkInUse: NULL;
subnetworkContainsSubnetworkConnections: NULL;
boundSubnetwork: NULL;
failureToDeleteSubnetwork: NULL;

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;

PRE_CONDITIONS

inv_existingSubnetwork

"**subnetwork** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_noSubnetworkTP

"**subnetwork** shall not refer to any *containerSN* in a <subnetworkIsDelimitedBy> relationship."

inv_noSubnetworkConnections

"**subnetwork** shall not refer to any *containerSN* in a <subnetworkHasSubnetworkConnections> relationship."

inv_noBinding

"**subnetwork** shall not refer to any *a_endTopological* or *z_endTopological* in a <linkBinds> or <linkConnectionIsTerminatedByTopologicalEntities> relationship or to any topologicalEntity in a <linkEndIsBoundTo> relationship."

POST_CONDITIONS

inv_noSubnetwork

"**subnetwork** must not refer to any *element* in a <layerNetworkDomainIsMadeOf> relationship."

EXCEPTIONS

IF PRE_CONDITION inv_existingSubnetwork NOT_VERIFIED RAISE_EXCEPTION

incorrectSubnetwork;

IF PRE_CONDITION inv_noSubnetworkTP NOT_VERIFIED RAISE_EXCEPTION subnetworkInUse;

IF PRE_CONDITION inv_noSubnetworkConnection NOT_VERIFIED RAISE_EXCEPTION

subnetworkContainsSubnetworkConnections;

IF PRE_CONDITION inv_noBinding NOT_VERIFIED RAISE_EXCEPTION boundSubnetwork;

IF POST_CONDITION inv_noSubnetwork NOT_VERIFIED RAISE_EXCEPTION

failureToDeleteSubnetwork;

```

;}

```

7.2.2.9 Crear enlace topológico (create topological link)

<COMMUNITY: Topology Management, ACTION: create topological link>

OPERATION createTopologicalLink {

INPUT_PARAMETERS

layerND: LayerNetworkDomainId;
a_End: LinkEndChoice;
z_End: LinkEndChoice;
suppliedUserIdentifier: UserIdentifier;
-- zero length string or 0 implies none supplied.
suppliedUserLabel: GraphicString;
-- zero length string implies none supplied.
suppliedDirectionality: linkDirectionality;

OUTPUT_PARAMETERS

topologicalLink: TopologicalLinkId;

RAISED_EXCEPTIONS

incorrectLinkEnds: LinkEndChoice;
userIdentifierNotUnique: suppliedUserIdentifier;
failureToSetUserIdentifier: NULL;
failureToCreateTopologicalLink: NULL;
failureToBindTopologicalLink: NULL;
failureToSetUserLabel: NULL;
failureToSetDirectionality: NULL;

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;
accessGroup: <INFORMATION OBJECT: topmanAccessGroup>;
suppliedUserIdentifier: <INFORMATION ATTRIBUTE: resourceId>;
suppliedUserLabel: <INFORMATION ATTRIBUTE: userLabel>;
suppliedDirectionality: <INFORMATION ATTRIBUTE: linkDirectionality>;
topologicalLink: <INFORMATION OBJECT: topmanLink>;

PRE_CONDITIONS

inv_sameLayerND

"**a_End** and **z_End** shall both refer to *element* in the same <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_uniqueUserIdentifier

"The **suppliedUserIdentifier** value shall not be equal to the <resourceId> value of any *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

POST_CONDITIONS

inv_existingTopologicalLink

"**link**, **a_End** and **z_End** refer to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_linkBinds

"**a_End** and **z_End** respectively refer to *a_endTopological* and *z_endTopological* in the <linkBinds> relationship where **topologicalLink** refers to *transferCapacityLink*."

inv_agreedUserIdentifier

"The <resourceId> value of <topmanTopologicalLink> referred to by **topologicalLink** is equal to the **suppliedUserIdentifier** value, if it is supplied."

inv_agreedUserLabel

"The <userLabel> value of <topmanTopologicalLink> referred to by **topologicalLink** is equal to the **suppliedUserLabel** value, if it is supplied.

"inv_agreedDirectionality

"The <linkDirectionality> value of <topmanTopologicalLink> referred to by **topologicalLink** is equal to the **suppliedDirectionality** value, if it is supplied, or set to 'undefined' if not supplied."

EXCEPTIONS

IF PRE_CONDITION inv_sameLayerND NOT_VERIFIED RAISE_EXCEPTION incorrectLinkEnds;

IF PRE_CONDITION inv_uniqueUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
userIdentifierNotUnique;

IF POST_CONDITION inv_existingTopologicalLink NOT_VERIFIED RAISE_EXCEPTION
failureToCreateTopologicalLink;

IF POST_CONDITION inv_linkBinds NOT_VERIFIED RAISE_EXCEPTION failureToBindTopologicalLink;

IF POST_CONDITION inv_agreedUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
failureToSetUserIdentifier;

IF POST_CONDITION inv_agreedUserLabel NOT_VERIFIED RAISE_EXCEPTION failureToSetUserLabel;

IF POST_CONDITION inv_agreedDirectionality NOT_VERIFIED RAISE_EXCEPTION
failureToSetDirectionality;

;}

7.2.2.10 Suprimir enlace topológico (delete topological link)

<COMMUNITY: Topology Management, ACTION: delete topological link>

OPERATION deleteTopologicalLink {

INPUT_PARAMETERS

layerND: LayerNetworkDomainId;

topologicalLink: TopologicalLinkId;

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

incorrectTopologicalLink: topologicalLink;

serverTrailExisting: NULL;

failureToDeleteTopologicalLink: NULL;

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;

topologicalLink: <INFORMATION OBJECT: topmanTopologicalLink>;

PRE_CONDITIONS;

inv_existingTopologicalLink

"**topologicalLink** refers to the *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_noServerTrail

"**topologicalLink** shall not refer to any *clientTL* of a <topologicalLinkIsSupportedByTrail> relationship."

POST_CONDITIONS

inv_noTopologicalLink

"**topologicalLink** does not participate in any <layerNetworkDomainIsMadeOf> AND <linkBinds> relationships."

EXCEPTIONS

```
IF PRE_CONDITION inv_existingTopologicalLink NOT_VERIFIED RAISE_EXCEPTION
    incorrectTopologicalLink;
IF PRE_CONDITION inv_noServerTrail NOT_VERIFIED RAISE_EXCEPTION serverTrailExisting;
IF POST_CONDITION inv_noTopologicalLink NOT_VERIFIED RAISE_EXCEPTION
    failureToDeleteTopologicalLink;
```

;}

7.2.2.11 Crear extremo de enlace topológico (create topological link end)

Esta operación crea un extremo de enlace topológico vinculado a una subred.

<COMMUNITY: Topology Management, ACTION: create topological link end>

OPERATION createTopologicalLinkEnd {

INPUT_PARAMETERS

```
layerND: LayerNetworkDomainId;
subnetwork: SubnetworkId;
suppliedUserIdentifier: UserIdentifier;
    -- zero length string or 0 implies none supplied.
suppliedUserLabel: GraphicString;
    -- zero length string implies none supplied.
suppliedDirection: topologicalEndDirection;
```

OUTPUT_PARAMETERS

```
topologicalLinkEnd: TopologicalLinkEndId;
```

RAISED_EXCEPTIONS

```
incorrectSubnetwork: subnetwork;
userIdentifierNotUnique: suppliedUserIdentifier;
failureToCreateTopologicalLinkEnd: NULL;
failureToBindTopologicalLinkEnd: NULL;
failureToSetUserIdentifier: NULL;
failureToSetUserLabel: NULL;
failureToSetDirection: NULL;
```

BEHAVIOUR

SEMI_FORMAL

PARAMETER_MATCHING

```
layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;
suppliedUserIdentifier: <INFORMATION ATTRIBUTE: resourceId>;
suppliedUserLabel: <INFORMATION ATTRIBUTE: userLabel>;
suppliedDirection: <INFORMATION ATTRIBUTE: topologicalEndDirection>;
topologicalLinkEnd: <INFORMATION OBJECT: topmanTopologicalLinkEnd>;
```

PRE_CONDITIONS

inv_subnetworkExisting

"**subnetwork** shall refer to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_uniqueUserIdentifier

"The **suppliedUserIdentifier** value shall not be equal to the <resourceId> value of any *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*.";

POST_CONDITIONS

inv_existingTopologicalLinkEnd

"**topologicalLinkEnd** and **subnetwork** refer to *element* in the same <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_boundTopologicalLinkEnd
"topologicalLinkEnd refers to *transferCapacityLE* in the <linkEndIsBoundTo> relationship where
subnetwork refers to *topologicalEntity*."

inv_agreedUserIdentifier
"The <resourceId> value of <topmanTopologicalLinkEnd> referred to by **topologicalLinkEnd** is equal to
the **suppliedUserIdentifier** value, if it is supplied."

inv_agreedUserLabel
"The <userLabel> value of <topmanTopologicalLinkEnd> referred to by **topologicalLinkEnd** is equal to
the **suppliedUserLabel** value, if it is supplied."

inv_agreedDirection
"The <topologicalEndDirection> value of <topmanTopologicalLinkEnd> referred to by
topologicalLinkEnd is equal to the **suppliedDirection** value, if it is supplied, or set to 'undefined' if not
supplied."

EXCEPTIONS

```
IF PRE_CONDITION inv_subnetworkExisting NOT_VERIFIED RAISE_EXCEPTION
    incorrectSubnetwork;
IF PRE_CONDITION inv_uniqueUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
    userIdentifierNotUnique;
IF POST_CONDITION inv_existingTopologicalLinkEnd NOT_VERIFIED RAISE_EXCEPTION
    failureToCreateTopologicalLinkEnd;
IF POST_CONDITION inv_boundTopologicalLinkEnd NOT_VERIFIED RAISE_EXCEPTION
    failureToBindTopologicalLinkEnd;
IF POST_CONDITION inv_agreedUserIdentifier NOT_VERIFIED RAISE_EXCEPTION
    failureToSetUserIdentifier;
IF POST_CONDITION inv_agreedUserLabel NOT_VERIFIED RAISE_EXCEPTION failureToSetUserLabel;
IF POST_CONDITION inv_agreedDirection NOT_VERIFIED RAISE_EXCEPTION
    failureToSetDirection;
;}
```

7.2.2.12 Suprimir extremo de enlace topológico (delete topological link end)

<COMMUNITY: Topology Management, ACTION: delete topological link end>

```
OPERATION deleteTopologicalLinkEnd {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        topologicalLinkEnd: TopologicalLinkId;

    OUTPUT_PARAMETERS
        -- none

    RAISED_EXCEPTIONS
        incorrectTopologicalLinkEnd: topologicalLinkEnd;
        serverTTPExisting: NULL;
        failureToDeleteTopologicalLinkEnd: NULL;
```

BEHAVIOUR

SEMI_FORMAL

```
PARAMETER_MATCHING
    layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
    topologicalLinkEnd: <INFORMATION OBJECT: topmanTopologicalLinkEnd>;

PRE_CONDITIONS
inv_existingTopologicalLinkEnd
    "topologicalLinkEnd refers to element in the <layerNetworkDomainIsMadeOf> relationship where  
layerND refers to containerLND."
```

```

inv_noServerTTP
  "topologicalLinkEnd shall not refer to any clientTLE in a
  <topologicalLinkEndIsSupportedByNetworkTTP> relationship."

```

```

POST_CONDITIONS
inv_noTopologicalLinkEnd
  "topologicalLinkEnd does not refer to any element in the <layerNetworkDomainIsMadeOf> relationship."

```

```

EXCEPTIONS
IF PRE_CONDITION inv_existingTopologicalLinkEnd NOT_VERIFIED RAISE_EXCEPTION
  incorrectTopologicalLinkEnd;
IF PRE_CONDITION inv_noServerTTP NOT_VERIFIED RAISE_EXCEPTION serverTTPExisting;
IF POST_CONDITION inv_noTopologicalLinkEnd NOT_VERIFIED RAISE_EXCEPTION
  failureToDeleteTopologicalLinkEnd;

```

```

;}
```

7.3 Interfaces de informes

7.3.1 Interfaz común de informe de cambio de identificador de recurso

La interfaz común de informe de cambio de identificador de recurso proporciona funcionalidad para informar el cambio del identificador de recurso de los recursos mediante la operación "report resourceId change". Satisface los requisitos de empresa indicados en <"Rec. G.852.2", COMMUNITY: Transport Network Enterprise Model, General policy>.

```

COMPUTATIONAL_INTERFACE commonReportResourceIdChangeIfce {
  OPERATION      <reportResourceIdChange>; }

```

7.3.1.1 Informar cambio de identificador de recurso (report resourceId change)

<"Rec. G.852.2", COMMUNITY: Transport Network Enterprise Model, General policy>

```

OPERATION reportResourceIdChange {
  INPUT_PARAMETERS
    layerND: LayerNetworkDomainId;
    involvedResource: ResourceChoice
    oldResourceIdentifier: UserIdentifier ::= SimpleNameType;
    newResourceIdentifier: UserIdentifier ::= SimpleNameType;

```

```

  OUTPUT_PARAMETERS
    -- none

```

```

  RAISED_EXCEPTIONS
    -- none

```

BEHAVIOUR

SEMI-FORMAL

```

  PARAMETER_MATCHING
    layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
    involvedResource: <INFORMATION OBJECT networkInformationTop>;
    oldResourceIdentifier: <INFORMATION ATTRIBUTE: resourceId>;
    newResourceIdentifier: <INFORMATION ATTRIBUTE: resourceId>;

```

TRIGGERING_CONDITIONS

PRE_CONDITIONS

```

  inv_existingInvolvedResource
    "involvedResource shall refer to element in the same <layerNetworkDomainIsMadeOf> relationship
    where layerND refers to containerLND."

```

```

    inv_oldResourceIdentifier
        "<resourceId> of the resource referred to by involvedResource must be equal to oldResourceIdentifier.";

    inv_differentNewResourceIdentifier
        "<resourceId> of the resource referred to by involvedResource must be different from
        newResourceIdentifier.";

    POST_CONDITIONS
        inv_newResourceIdentifier
            "<resourceId> of the resource referred to by involvedResource must be equal to newResourceIdentifier.";

    EXCEPTIONS
        -- none
;}
```

7.3.2 Interfaz de informes de recursos de topología

La interfaz de informes de recursos de topología proporciona funcionalidad para informar sobre la creación y la supresión de los recursos definidos en <"Rec. G.852.2", COMMUNITY: Transport Network Enterprise Model>.

```

COMPUTATIONAL_INTERFACE topologyResourcesReportingIfce {
    OPERATION
        <reportAccessGroupCreation>;
        <reportAccessGroupDeletion>;
        <reportLinkCreation>;
        <reportLinkDeletion>;
        <reportLinkEndCreation>;
        <reportLinkEndDeletion>;
        <reportSubnetworkTPCreation>;
        <reportSubnetworkTPDeletion>;
        <reportSubnetworkCreation>;
        <reportSubnetworkDeletion>; }
        <reportTopologicalLinkCreation>;
        <reportTopologicalLinkDeletion>;
        <reportTopologicalLinkEndCreation>;
        <reportTopologicalLinkEndDeletion>; }
```

7.3.2.1 Informar creación de grupo de acceso (report access group creation)

<COMMUNITY: Topology Management, ACTION: report access group creation>

```

OPERATION reportAccessGroupCreation {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        accessGroup: AccessGroupId;

    OUTPUT_PARAMETERS
        -- none

    RAISED_EXCEPTIONS
        -- none

    BEHAVIOUR
    SEMI-FORMAL
        PARAMETER_MATCHING
            layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
            accessGroup: <INFORMATION OBJECT: topmanAccessGroup>;
```

```

    TRIGGERING_CONDITIONS
    PRE_CONDITIONS
        -- none

    POST_CONDITIONS
    inv_existingAccessGroup
        "accessGroup refers to element in the <layerNetworkDomainIsMadeOf> relationship where layerND refers
        to containerLND."

    EXCEPTIONS
        -- none
;}

```

7.3.2.2 Informar supresión de grupo de acceso (report access group deletion)

<COMMUNITY: Topology Management, ACTION: report access group deletion>

```

OPERATION reportAccessGroupDeletion {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        accessGroup: AccessGroupId;

    OUTPUT_PARAMETERS
        -- none

    RAISED_EXCEPTIONS
        -- none

    BEHAVIOUR
    SEMI-FORMAL
        PARAMETER_MATCHING
            layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
            accessGroup: <INFORMATION OBJECT: topmanAccessGroup>;

    TRIGGERING_CONDITIONS
    PRE_CONDITIONS
    inv_existingAccessGroup
        "accessGroup refers to element in the <layerNetworkDomainIsMadeOf> relationship where layerND refers
        to containerLND."

    inv_noNetworkTTPs
        "accessGroup shall not refer to any containerAG in an <accessGroupIsMadeOfNetworkTTPs>
        relationship."

    POST_CONDITIONS
    inv_noAccessGroup
        "accessGroup shall not refer to any element in the <layerNetworkDomainIsMadeOf> relationship."

    EXCEPTIONS
        -- none
;}

```

7.3.2.3 Informar creación de enlace (report link creation)

<COMMUNITY: Topology Management, ACTION: report link creation>

```

OPERATION reportLinkCreation {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        link: LinkId;

```

a_End: LinkEndChoice;
z_End: LinkEndChoice;

OUTPUT PARAMETERS
-- none

RAISED EXCEPTIONS
-- none

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>; link: <INFORMATION OBJECT:
topmanLink>;
subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;
accessGroup: <INFORMATION OBJECT: topmanAccessGroup>;

TRIGGERING_CONDITIONS

PRE_CONDITIONS
-- none

POST_CONDITIONS

inv_existingLink

"**link** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to
containerLND."

inv_linkBinds

"**a_End** and **z_End** respectively refer to *a_endTopological* and *z_endTopological* in the <linkBinds>
relationship where **link** refers to *transferCapacityLink*."

EXCEPTIONS
-- none

;}

7.3.2.4 Informar supresión de enlace (report link deletion)

<COMMUNITY: Topology Management, ACTION: report link deletion>

OPERATION reportLinkDeletion {

INPUT_PARAMETERS

layerND: LayerNetworkDomainId;
link: LinkId;

OUTPUT_PARAMETERS
-- none

RAISED_EXCEPTIONS
-- none

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
link: <INFORMATION OBJECT: topmanLink>;

TRIGGERING_CONDITIONS

PRE_CONDITIONS

inv_existingLink

"**link** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to
containerLND."

```

inv_noLinkConnection
    "link shall not refer to any containerLink of a <linkHasLinkConnections> relationship."

    POST_CONDITIONS
    inv_noLink
        "link does not refer to any element in the <layerNetworkDomainIsMadeOf> relationship."

    EXCEPTIONS
        -- none
;}
```

7.3.2.5 Informar creación de extremo de enlace (report link end creation)

<COMMUNITY: Topology Management, ACTION: report link end creation>

```

OPERATION reportLinkEndCreation {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        linkEnd: LinkEndId;
        subnetwork: SubnetworkId;

    OUTPUT PARAMETERS
        -- none

    RAISED EXCEPTIONS
        -- none

    BEHAVIOUR
    SEMI-FORMAL
        PARAMETER_MATCHING
            layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
            linkEnd: <INFORMATION OBJECT: topmanLinkEnd>;
            subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;

        TRIGGERING_CONDITIONS
        PRE_CONDITIONS
            -- none

        POST_CONDITIONS
        inv_existingLinkEnd
            "linkEnd and subnetwork refer to element in the same <layerNetworkDomainIsMadeOf> relationship
            where layerND refers to containerLND."

        inv_boundLinkEnd
            "linkEnd refers to transferCapacityLE in the <linkEndIsBoundTo> relationship where subnetwork refers to
            topologicalEntity."

    EXCEPTIONS
        -- none
;}
```

7.3.2.6 Informar supresión de extremo de enlace (report link end deletion)

<COMMUNITY: Topology Management, ACTION: report link end deletion>

```

OPERATION reportLinkEndDeletion {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        linkEnd: LinkEndId;
```

OUTPUT PARAMETERS

-- none

RAISED EXCEPTIONS

-- none

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;

linkEnd: <INFORMATION OBJECT: topmanLinkEnd>;

TRIGGERING_CONDITIONS

PRE_CONDITIONS

inv_existingLinkEnd

"**linkEnd** refers to *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

inv_existingLinkEndBinding

"**linkEnd** refers to *topologicalEntity* in the <linkEndIsBoundTo> relationship."

inv_noNetworkCTPs

"**linkEnd** shall not refer to any *containerLE* in a <linkEndHasNetworkCTPs> relationship."

POST_CONDITIONS

inv_noLinkEnd

"**linkEnd** does not refer to any *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

EXCEPTIONS

-- none

;}

7.3.2.7 Informar creación de subred (report subnetwork creation)

<COMMUNITY: Topology Management, ACTION: report subnetwork creation>

OPERATION reportSubnetworkCreation {

INPUT_PARAMETERS

layerND: LayerNetworkDomainId;

subnetwork: SubnetworkId;

networkTTPs: SetOfNnetworkTTPs;

-- the networkTTPs parameter value is provided when <PERMISSION: informTTPs> is supported.

OUTPUT_PARAMETERS

-- none

RAISED_EXCEPTIONS

-- none

BEHAVIOUR

SEMI-FORMAL

PARAMETER_MATCHING

layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;

subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;

networkTTPs ELEMENTS: <INFORMATION OBJECT: topmanNetworkTTP>;

TRIGGERING_CONDITIONS

PRE_CONDITIONS

-- none

```

    POST_CONDITIONS
    inv_existingSubnetwork
        "subnetwork refer to the element in the <layerNetworkDomainIsMadeOf> relationship where layerND
        refers to containerLND."
    ;

    EXCEPTIONS
        -- none
;}
```

7.3.2.8 Informar supresión de subred (report subnetwork deletion)

<COMMUNITY: Topology Management, ACTION: report subnetwork deletion>

```

OPERATION reportSubnetworkDeletion {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        subnetwork: SubnetworkId;

    OUTPUT_PARAMETERS
        -- none

    RAISED_EXCEPTIONS
        -- none

    BEHAVIOUR
    SEMI-FORMAL
        PARAMETER_MATCHING
            layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
            subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;

    TRIGGERING_CONDITIONS
        PRE_CONDITIONS
        inv_existingSubnetwork
            "subnetwork must refer to element in a <layerNetworkDomainIsMadeOf> relationship where layerND
            refers to containerLND."

        inv_noSubnetworkTP
            "subnetwork shall not refer to any containerSN in a <subnetworkIsDelimitedBy> relationship."

        inv_noBinding
            "subnetwork shall not refer to any a_endTopological or z_endTopological in a <linkBinds> relationship or
            to any topologicalEntity in a <linkEndIsBoundTo> relationship."

        POST_CONDITIONS
        inv_noSubnetwork
            "subnetwork does not participate in the <layerNetworkDomainIsMadeOf> relationship."

        EXCEPTIONS
            -- none
;}
```

7.3.2.9 Informar creación de TP de subred (report subnetworkTP creation)

<COMMUNITY: Topology Management, COMMUNITY POLICY: architecturalConstraints>


```

OPERATION reportSubnetworkTPCreation {
  INPUT_PARAMETERS
    layerND: LayerNetworkDomainId;
    subnetworkTP: SubnetworkTPId ::= SimpleNameType;

  OUTPUT_PARAMETERS
    -- none

  RAISED_EXCEPTIONS
    -- none

BEHAVIOUR
SEMI-FORMAL
  PARAMETER_MATCHING
    layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
    subnetworkTP: <INFORMATION OBJECT: topmanSubnetworkTP>;

  TRIGGER_CONDITION
  PRE_CONDITIONS
    -- none

  POST_CONDITIONS
    inv_existingSubnetworkTP
      "subnetworkTP refer to the element in the <layerNetworkDomainIsMadeOf> relationship where layerND
      refers to containerLND."
    ;

  EXCEPTIONS
    -- none
;}

```

7.3.2.10 Informar supresión de TP de subred (report subnetworkTP deletion)

<COMMUNITY: Topology Management, COMMUNITY POLICY: architecturalConstraints>

```

OPERATION reportSubnetworkTPDeletion {
  INPUT_PARAMETERS
    layerND: LayerNetworkDomainId;
    subnetworkTP: SubnetworkTPId ::= SimpleNameType;

  OUTPUT_PARAMETERS
    -- none

  RAISED_EXCEPTIONS
    -- none

BEHAVIOUR
SEMI-FORMAL
  PARAMETER_MATCHING
    layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
    subnetworkTP: <INFORMATION OBJECT: topmanSubnetworkTP>;

  TRIGGER_CONDITION
  PRE_CONDITIONS
    inv_existingSubnetworkTP
      "subnetworkTP must refer to element in a <layerNetworkDomainIsMadeOf> relationship where layerND
      refers to containerLND."

```

```

    POST_CONDITIONS
    inv_noSubnetworkTP
    "subnetworkTP does not participate in the <layerNetworkDomainIsMadeOf> relationship."

    EXCEPTIONS
    -- none
;}

```

7.3.2.11 Informar creación de enlace topológico (report topological link creation)

<COMMUNITY: Topology Management, ACTION: report topological link creation>

```

OPERATION reportTopologicalLinkCreation {
    INPUT_PARAMETERS
    layerND: LayerNetworkDomainId;
    topologicalLink: TopologicalLinkId;
    a_End: LinkEndChoice;
    z_End: LinkEndChoice;

    OUTPUT PARAMETERS
    -- none

    RAISED EXCEPTIONS
    -- none

    BEHAVIOUR
    SEMI-FORMAL
    PARAMETER_MATCHING
    layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
    topologicalLink: <INFORMATION OBJECT: topmanTopologicalLink>;
    subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;
    accessGroup: <INFORMATION OBJECT: topmanAccessGroup>;

    TRIGGERING_CONDITIONS
    PRE_CONDITIONS
    -- none

    POST_CONDITIONS
    inv_existingTopologicalLink
    "topologicalLink refers to element in the <layerNetworkDomainIsMadeOf> relationship where layerND
    refers to containerLND."

    inv_linkBinds
    "a_End and z_End respectively refer to a_endTopological and z_endTopological in the <linkBinds>
    relationship where link refers to transferCapacityLink."

    EXCEPTIONS
    -- none
;}

```

7.3.2.12 Informar supresión de enlace topológico (report topological link deletion)

<COMMUNITY: Topology Management, ACTION: report topological link deletion>

```

OPERATION reportTopologicalLinkDeletion {
    INPUT_PARAMETERS
    layerND: LayerNetworkDomainId;
    topologicalLink: TopologicalLinkId;

```

```

OUTPUT_PARAMETERS
    -- none

RAISED_EXCEPTIONS
    -- none

BEHAVIOUR
SEMI-FORMAL
    PARAMETER_MATCHING
        layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
        topologicalLink: <INFORMATION OBJECT: topmanTopologicalLink>;

    TRIGGERING_CONDITIONS
        PRE_CONDITIONS
            inv_existingTopologicalLink
                "topologicalLink refers to element in the <layerNetworkDomainIsMadeOf> relationship where layerND
                refers to containerLND."
            inv_noLinkConnection
                "topologicalLink shall not refer to any containerLink of a <linkHasLinkConnections> relationship."

        POST_CONDITIONS
            inv_noLink
                "topologicalLink does not refer to any element in the <layerNetworkDomainIsMadeOf> relationship."

    EXCEPTIONS
        -- none
;}
```

7.3.2.13 Informar creación de extremo de enlace topológico (report topological link end creation)

<COMMUNITY: Topology Management, ACTION: report topological link end creation>

```

OPERATION reportTopologicalLinkEndCreation {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        topologicalLinkEnd: TopologicalLinkEndId;
        subnetwork: SubnetworkId;

    OUTPUT_PARAMETERS
        -- none

    RAISED_EXCEPTIONS
        -- none

    BEHAVIOUR
SEMI-FORMAL
    PARAMETER_MATCHING
        layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
        topologicalLinkEnd: <INFORMATION OBJECT: topmanTopologicalLinkEnd>;
        subnetwork: <INFORMATION OBJECT: topmanSubnetwork>;

    TRIGGERING_CONDITIONS
        PRE_CONDITIONS
            -- none
```

```

    POST_CONDITIONS
    inv_existingLinkEnd
        "topologicalLinkEnd and subnetwork refer to element in the same <layerNetworkDomainIsMadeOf>
        relationship where layerND refers to containerLND."

    inv_boundTopologicalLinkEnd
        "topologicalLinkEnd refers to transferCapacityLE in the <linkEndIsBoundTo> relationship where
        subnetwork refers to topologicalEntity."

    EXCEPTIONS
        -- none
;}
```

7.3.2.14 Informar supresión de extremo de enlace topológico (report topological link end deletion)

<COMMUNITY: Topology Management, ACTION: report topological link end deletion>

```

OPERATION reportTopologicalLinkEndDeletion {
    INPUT_PARAMETERS
        layerND: LayerNetworkDomainId;
        topologicalLinkEnd: TopologicalLinkEndId;
```

```

    OUTPUT_PARAMETERS
        -- none
```

```

    RAISED_EXCEPTIONS
        -- none
```

BEHAVIOUR

SEMI-FORMAL

```

    PARAMETER_MATCHING
        layerND: <INFORMATION OBJECT: topmanLayerNetworkDomain>;
        topologicalLinkEnd: <INFORMATION OBJECT: topmanTopologicalLinkEnd>;
```

TRIGGERING_CONDITIONS

PRE_CONDITIONS

```

    inv_existingTopologicalLinkEnd
        "topologicalLinkEnd refers to element in the <layerNetworkDomainIsMadeOf> relationship where
        layerND refers to containerLND."
```

```

    inv_existingTopologicalLinkEndBinding
```

"**topologicalLinkEnd** refers to *topologicalEntity* in the <linkEndIsBoundTo> relationship."

```

    inv_noNetworkCTPs
```

"**topologicalLinkEnd** shall not refer to any *containerLE* in a <linkEndHasNetworkCTPs> relationship."

POST_CONDITIONS

```

    inv_noTopologicalLinkEnd
```

"**topologicalLinkEnd** does not refer to any *element* in the <layerNetworkDomainIsMadeOf> relationship where **layerND** refers to *containerLND*."

EXCEPTIONS

```

    -- none
;}
```

7.4 Producciones de soporte ASN.1

En esta especificación, cuando se utiliza un nombre de interfaz dentro de una producción ASN.1, se utilizará la misma etiqueta, con la letra inicial mayúscula. La definición de tipo ASN.1 completa para esta interfaz de indagación (por ejemplo, uso de ObjectIdentifier, INTEGER,) se desarrollará como parte del punto de vista de la ingeniería, con la tecnología pertinente.

```
AccessGroupId ::= CHOICE {
    accessGroupQueryIfce      TopmanAccessGroupQueryIfce
    userIdentifier            UserIdentifier};
LayerNetworkDomainId ::= CHOICE {
    layerNetworkDomainQueryIfce TopmanLayerNetworkDomainQueryIfce,
    userIdentifier              UserIdentifier };
LinkEndChoice ::= CHOICE {
    subnetwork                SubnetworkId,
    accessGroup               AccessGroupId };
LinkEndId ::= CHOICE {
    linkEndQueryIfce          TopmanLinkEndQueryIfce,
    userIdentifier            UserIdentifier };
LinkId ::= CHOICE {
    linkQueryIfce              TopmanLinkQueryIfce,
    userIdentifier              UserIdentifier };
ResourceChoice ::= CHOICE {
    resourceId                 ResourceIfce,
    userIdentifier              SimpleNameType};
SetOfNetworkTTPs ::= SET OF CHOICE {
    networkTTPId               TopmanNetworkTTPQueryIfce,
    userIdentifier              SimpleNameType}
SubnetworkId ::= CHOICE {
    subnetworkQueryIfce        TopmanSubnetworkQueryIfce,
    userIdentifier              UserIdentifier};
TopologicalLinkEndId ::= CHOICE {
    topologicalLinkEndQueryIfce TopmanTopologicalLinkEndQueryIfce,
    userIdentifier              UserIdentifier };
TopologicalLinkId ::= CHOICE {
    topologicalLinkQueryIfce    TopmanTopologicalLinkQueryIfce,
    userIdentifier              UserIdentifier };
UserIdentifier ::= SimpleNameType;
```


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